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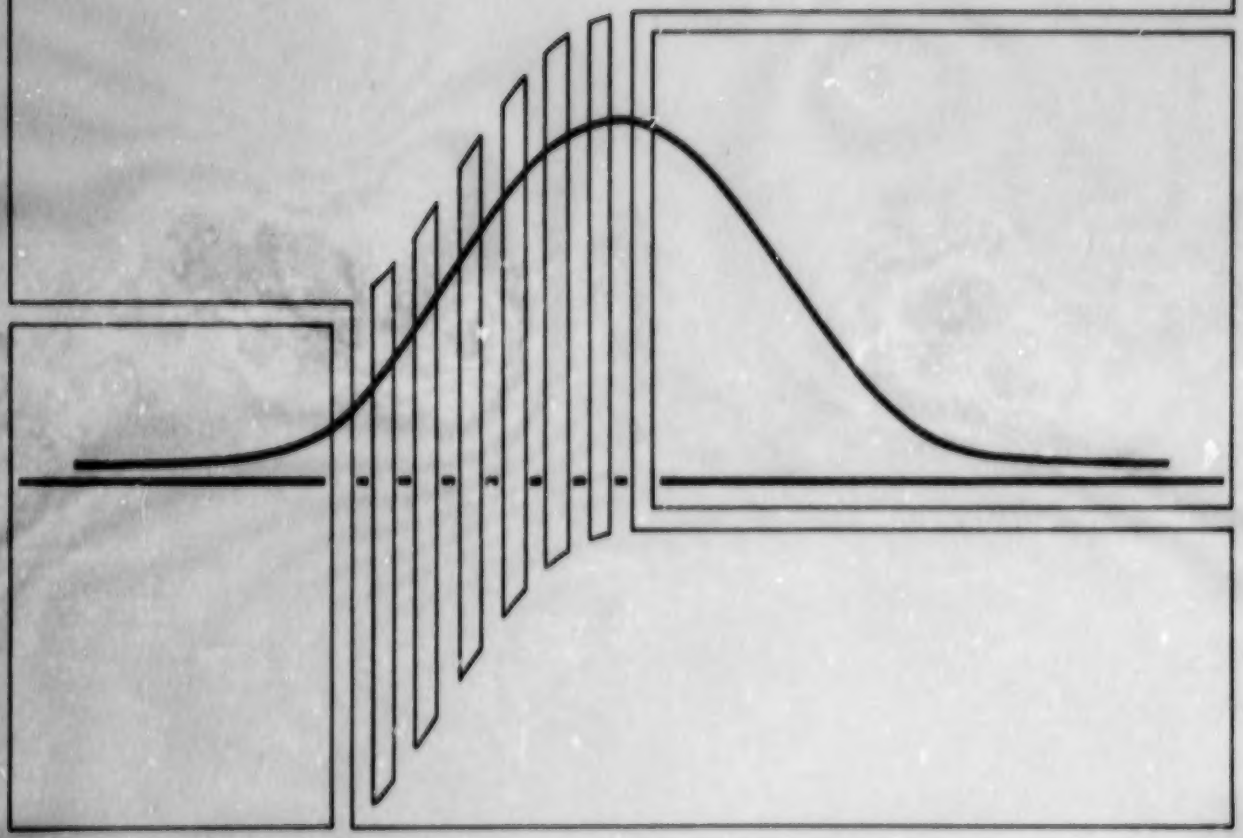
Manuals on Measurement and Evaluation

Manual One: Basic Concepts in Educational Evaluation



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Le manuel présente les concepts fondamentaux que tout éducateur doit connaître pour entreprendre l'évaluation dans sa classe. Les trois principales étapes du processus d'évaluation sont décrites en détail et illustrées d'exemples dans le but d'aider les enseignants à comprendre l'importance de chaque étape. Ces trois étapes sont: la mesure qui consiste à regrouper, organiser et interpréter l'information pertinente, le jugement qui consiste à donner son opinion sur l'apprentissage d'un étudiant ou d'une classe, la décision qui consiste à faire les choix qui s'imposent. Les deux principales approches en évaluation, l'évaluation formative et l'évaluation sommative, sont présentées brièvement avec des exemples pratiques portant sur les éléments essentiels de chaque approche.

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Direction du développement de l'évaluation
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FOREWORD

The main purpose of the series of **Manuals of Educational Evaluation** is to inform educators in Québec on learning assessment. This series is derived from and meant to help in the application of the General Policy for Educational Evaluation published in 1981 by the ministère de l'Éducation du Québec.

Publication of the **Manuals on Educational Evaluation** also answers a need for English reference documents specifically written to inform educators on evaluation terminology, current evaluation concepts, and assessment procedures used in Québec schools. The series also explains the underlying reasons for choices made by the MEQ in promoting formative and summative evaluation and the various options open to teachers when planning educational evaluation.

The four manuals in this series are intended chiefly for preschool, elementary, and secondary school teachers and emphasize the practical classroom application of the principles presented in these documents. However, other educators with responsibilities in educational evaluation will find the **Manuals on Educational Evaluation** useful in their work.

Introduction

This first manual in the series **Manuals of Educational Evaluation** presents essential concepts and terms used in educational evaluation. It also briefly presents the tenets of formative and summative evaluation which will be covered in greater detail in Manuals Three and Four. Educational evaluation is presented as a process which is composed of three steps:

- **measurement:** concerned with the collection, organization, and interpretation of pertinent information;
- **judgement:** concerned with giving an opinion of the learning of a student or of a class;
- **decision:** concerned with making a choice among various courses of action to be taken.

The MEQ stresses in all its documents that evaluation is an integral part of instructional activities. Therefore, when these activities are being planned, the various types of educational evaluation to be used should be considered.

This manual presents only an overview of educational evaluation in Québec. Readers are referred to the other manuals in the series for more detailed information.

Manual Two	Glossary
Manual Three	Formative Evaluation*
Manual Four	Summative Evaluation*

*Note: Manual Three and Four are currently being translated and adapted for English speaking educators.

CHAPTER ONE - The Relationship Between Educational Evaluation and Teaching

We all engage daily in some form of evaluation based on our own personal perceptions and values. This type of evaluation is highly subjective. In education, more objective forms of evaluation are needed to make sound and fair judgements. All four manuals present evaluative practices which help teachers to arrive at a more "objective" assessment of students' learning. In this chapter, we will examine the underlying values and principles which will serve as the foundation for evaluation.

In current teaching strategies, educational evaluation serves two basic roles: 1) as a teaching/learning aid, and 2) as a means of assessing students' achievements for accreditation.

1.1 Educational Evaluation in the Teaching/Learning Process

Traditionally, educational evaluation has been used to assess the acquisition of skills and knowledge at the end of the year. More recently, it has been presented as an integral part of the teaching/learning process. In the first instance, evaluation is carried out to assess the student's achievement as related to a specific program of studies. In order to gather the information required for this purpose, examinations covering the program in question are used. The results obtained are then interpreted and the student's achievement is assessed. Based upon this assessment, a decision is made concerning the promotion or certification of the student. The results and the decision are permanently recorded in an official school report. This type of evaluation, which is called summative, has essentially an administrative goal. Manual Four deals specifically and in greater detail with this type of evaluation.

Evaluation may also have a more immediate pedagogical role; that is, to facilitate learning. In this case, the information needed is gathered via the use of various measurement instruments which make it possible to monitor the student's progress or to assess immediate achievement. Subsequently, the student's progress is judged, and both the student and those who can assist in his or her learning are informed of this judgement. This type of evaluation is called formative and has an essentially pedagogical goal. Manual Three deals specifically with this type of evaluation.

1.3 The Underlying Tenets of Educational Evaluation

In the **General Policy for Educational Evaluation** the following values are presented:

> *To evaluate is to judge, that is, in some measure, to render justice. The evaluation of a pupil's learning requires the accumulation of a set of relevant data that intuition alone, and even less, caprice, cannot furnish. The often unfortunate consequences for a pupil of superficial evaluation are generally recognized. The details and the nuances which accrue from a systematic and extended evaluation process bear the seed of a more soundly based judgement, and consequently of a practice more likely to render justice to the pupil.*
>
> *Equality, particularly, individual equality within the educational system, requires a careful evaluation of the pupil. How, in this respect, can it be assured that individual difficulties will be dealt with through the means afforded by the educational system, unless these difficulties are promptly identified through evaluation that is vigilant and animated by a concern that each pupil receive the best possible service from the system?*
>
> *To uphold these two values, educational evaluation should be characterized by intellectual honesty and concern. In essence, when one evaluates a pupil's learning or general development, one makes a judgement about a human being, who has an inalienable right that such judgements be as soundly based on reality as possible, just as the evaluator has a duty to recognize the limitations of the available means and the difficulty of fully knowing a human being.*[1]

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1. Gouvernement du Québec, ministère de l'Éducation, Direction générale du développement pédagogique. General Policy for Educational Evaluation for preschool, elementary and secondary schools, 1981, p. 4.

Clearly, the values of justice and equality are the basis of educational evaluation in Québec. The series, **Manuals in Educational Evaluation** are published in order to better evaluate students according to these principles. These values are not only important in evaluation, but also in the overall educational process. For example, the learning situation, the choice of material used, the grouping of students, the use of peer evaluation, all are based on value judgements.

It is in the final phase of the evaluation process, that is the decision making phase, that the question of values is central. Only if the basic values have been clearly defined, as discussed in the document previously quoted, can teachers justify making specific educational decisions in order to help students.

CHAPTER TWO - The Evaluation Process

As stated previously, the evaluation process involves three major steps. The first step, **measurement**, involves the collection, organization, and interpretation of pertinent information. In the next step, a **judgement** is made regarding the success or failure of performance. During the third and final step, possible options are reviewed and a **decision** is made. This is the process referred to in the General Policy as:

> *... a process intended to support appraisals of the situation of a pupil in certain areas of their development, with a view to making the best possible decisions about his future progress... (p. 7)*

The process of evaluation whether formative or summative is the same. It is important first to identify evaluation goals since they will influence such things as; the type of information gathered, the way criteria and standards of performance are defined, and factors taken into consideration when judging the student's situation. Such goals will also determine the range of actions available when the time comes to make instructional decisions. However, whether the purpose of evaluation is formative or summative, the evaluation procedure will always consist of the same three steps: measurement, judgement, and decision.

2.1 Step I: Measurement

Measurement consists of collecting, organizing, and interpreting pertinent data to be used in forming judgements and making decisions.

a) Collecting Data

Measurement instruments such as objective tests, observation checklists, and rating scales can be used to gather information. Depending on the purpose of the evaluation, a choice must be made regarding the content of the measurement instrument, or what the instrument will measure.

Data can be collected on observable behavior only if it is quantifiable. At this time, it is essential to obtain valid information; that is, information that is directly related to the object of measurement. For example, if we wish to evaluate mathematical achievement at a grade 6 level, we must be sure to include in our test only questions that sample the concepts that have already been taught.

b) Organizing the Data

The raw scores obtained by means of a measurement instrument must be organized before they can be interpreted in terms of performance.

c) Interpreting the Results

Measurement becomes meaningful to a teacher only once the results are interpreted. Raw scores or raw data are maningless in themselves they must be compared to a reference point of group in order to make the information collected understandable. The interpretation of the results obtained may be norm or criterion referenced depending on the instrument used.

When a norm-referenced interpretation is used the results become meaningful when the raw scores are compared to the mean of raw scores of a reference group. In this case individual student results are ranked using a scale such as a stanine, centile or quintile scale. The results in this case are always presented as being "above the average or" one of the "best" of a group or class (highest ranking) in Geography.

However, a student's result may also be compared to a performance standard or by one pre-established passing scoring which reflects what is expected of the student. The performance standards and specific criteria used must be observable behaviors that in themselves indicate clearly the performances expected. If a teacher uses this second method, when interpreting results these type of interpretation is said to be a criterion-referenced interpretation.

If the information collected is detailed enough, a teacher may also undertake a more in-depth analysis of the results, often called a diagnostic interpretation. In this type of interpretation a teacher focuses on the objectives not mastered and attempts to find out why this has happened. Several reasons may be forwarded and each is verified by subsequent assessment in order to plan remedial teaching strategies.

STEP II

2.2 Judging the Results

The key stage in the evaluation process is the judgement of student learning. Judgement involves not only the technical interpretation of raw scores but also the use of all relevant supplementary information which may help render the judgement more relevent and valid. The type of complementary information that a teacher should seek concerns:

- a student's motivation, his or her growth, his or her maturity, etc.
- the program
- other relevant circumstances such as the timing of the assessment, a specific problem affecting a student or students, the various activities undertaken, the developmental time required for an ability, etc.

For example, the ability to interpret and understand an historical text may be judged "acceptable" in November even if not all the global requirements are met, since these global objectives are only expected to be mastered in June. A student will mature emotionally and cognitively during the year. Therefore a teacher must allow time for this growth to occur and suspend "final" judgment.

Looking at results in a broader perspective allows a teacher to obtain a more balanced judgement. However in order not to be influenced by extraneous factors, teachers must use guidelines which will help in arriving at sound, valid judgements of students' mastery of program objectives.

STEP III

2.3 Choosing Various Options

It must be remembered, that above all evaluation has either a formative or a summative role. Regardless of whether it is formative or summative, before the evaluation is undertaken, a teacher must consider the ultimate decision he or she has to make at the end of the evaluation process. If this is accomplished, the data obtained will be relevant to the decision to be made.

When it is time to make a decision, the range of possible options must be studied and choices made based on the goal of the evaluation, the specific results, and their interpretation. The decision in question may concern:

- Teaching materials : textbooks, audiovisual projects, etc.
- Teaching strategies: use of reports, examples, reinforcement, questions, specific techniques, and group dynamics, etc.
- Human resources : counsellor, pedagogical consultant, psychologist, or principal
- Use of time in in classroom : time alloted for projects, activities
- Student placement : enriched or remediation classes, diagnostic screening.

The above list illustrates a few of the pedagogical decisions which could be made as a result of the data obtained from evaluating students' learning. It is precisely during the decision phase of the evaluation process, that the implications of a teacher's decision becomes evident to the student.

Even if the decision phase occurs in the latter part of the evaluation process the type of decisions to be made must be considered at the outset of the evaluation process.

The following table illustrates the three steps involved in the evaluation process.

Table 1 - Educational Evaluation Process

Step	Description
1. Measurement	
a) Collection of data	To collect information directly linked to what is to be measured.
b) Organization of data	To study the information gathered and reorganize it for interpretation.
c) Interpretation of data	To draw tentative conclusions from the data collected and organized.
2. Judgement	To assess the student's learning, taking into account other factors such as: personality, maturation, family background, etc.
3. Decision	To study the possible options and choose those which are appropriate.

CHAPTER THREE - Planning to Evaluate Classroom Learning

As stated previously, evaluation is an integral part of classroom learning. Just as learning activities need to be planned, so does evaluation. The steps to follow in evaluating classroom learning are to:

1. Establish the purpose of evaluation.
2. Specify the kind of information needed.
3. Choose the type of instrument required.
4. Implement the evaluation.

The choices that are made at this point in the planning of the evaluation process will greatly affect the format and the content of the measurement instrument. The following examples will illustrate some of the points to consider in evaluating classroom learning.

3.1 Examples of Evaluation in a Classroom

Two examples will permit a better understanding of formative and summative evaluation.

First example

A teacher wonders which is the most effective teaching strategy to adopt in order to help students having problems solving a specific mathematics problem. The teacher already knows the various ways to solve the problem (estimation, using a calculator, using tables, using set equations). Using one of these problem-solving procedures the teacher notes all the specific steps a student must follow to arrive at the correct answer and then uses this chart to focus on each of the students' problem solving strategies. By observing how the students solve five or six similar problems, a teacher is able to assess precisely where each student is having problems in this specific learning unit and how to help them individually find the solution. By being assigned appropriate tasks, the students can practice their new learning and thus reinforce what has been taught.

Second Example

A teacher must submit end-of-year school results which will be used by the board in rendering a decision concerning students' promotion to a higher grade.

Keeping in mind the various board and ministry evaluation policies, the teacher prepares a series of three exams based on the overall, global objectives of the program. The first exam is presented in April, the second in May and the third in June. The raw score results are interpreted in terms of the passing criterion (60%). In order to make the final judgement on a student's yearly achievement, the teacher will also consider other pertinent sources of information which are included in his or her class mark folder. Before making any recommendations, the teacher will also consider the various options open to the student such as; tutorials, peer help, remedial classes, diagnostic services, etc. in order to obtain the best support in the future.

In the two examples given, there are the usual three steps of the evaluation procedure: measurement, judgement, and decision. Other elements, external to the evaluation procedure per se, are involved in the planning. In both situations, the following are considered:

a) the purpose for the evaluation
b) the content of the evaluation
c) the implementation of evaluation: timing, person responsible for the evaluation, and the instrument of measurement used.

The following table clearly presents these two examples in terms of the above three aspects: purpose, content, method or implementation.

Table 2 - Analysis of the Examples of the Evaluation Procedure

Purpose	Object	Implementation		
		Instrument	Examiner	Timing
First Example				
Formative*	Problem-solving procedure	Observation, test, exam	Teacher	Any time during the year
Second Example				
Summative**	End-of-year learning	Year end examinations	Teacher	June

The above table presents a summary of the analysis of both situations with respect to: purpose, object, and implementation.

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* Manual Three of the present series provides information on the means of carrying out formative evaluation.

** Manual Four of the present series provides information on the means of carrying out summative evaluation.

3.2 Timing Evaluation

The timing of the evaluation will be based on the goal of the evaluation. In formative evaluation, a teacher may evaluate learning at any time throughout the year, therefore timing is very flexible, depending on the immediate needs of the student and teacher. In summative evaluation, assessment undertaken at the end of a semester or school year is used primarily for administrative reasons, and is determined well in advance (usually several months in advance).

Summative evaluation procedures must also be planned in accordance with teaching. In planning summative evaluation, the following questions must be answered:

Concerning the object of evaluation:

- What kinds of information are needed to confirm that the objectives of a program of studies have been achieved?

Concerning the implementation of evaluation:

- What measurement instrument or procedure will be used to collect and organize, and interpret the information required?
- Who will carry out the evaluation?
- When will the pertinent information be collected?

The appropriate measurement instruments are then prepared and administered in accordance with the schedule established.

In short, to plan educational evaluation means to foresee a certain number of evaluation procedures which will be used either for formative or summative assessment. It also means specifyinng the goal of evaluation and choosing the means of implementing each evaluation procedure.

Educational evaluation is always planned in conjunction with what is taught and how it is taught. Such joint planning also allows teachers to foresee the evaluation procedures needed to back up the many instructional decisions involved in their work.

Conclusion

The purpose of this first manual has been to present the general principles and values of educational evaluation which the MEQ advocates, to describe its place in education, and the role it plays in the teaching/learning process.

In this first booklet of the Manuals in Educational Evaluation series, educational evaluation was presented as an integral part of the teaching/learning process. It was also shown that a well planned evaluation program ensures content validity of the measurement instrument used.

Before the manuals for this series were written, English educators were consulted on their needs in to evaluation. The major need expressed was the use by the M.E.Q. of clear, well defined evaluation terms that are understood by teachers. As a result, well over 70 terms related to educational assessment have been be defined. These definitions are presented in the next manual, entitled Glossary, and will be used as a reference document for all publications from la Direction générale de l'évaluation et des ressources didactiques.

MANUALS ON EDUCATIONAL EVALUATION

A brief outline of the contents of each manual is presented below in order to aid readers select the appropriate document. Presently, only manual one and two are available to all English educators. Manuals three and four are being translated and once this is accomplished, they will be adapted in order to respect the different pedagogical procedures and policies found in the English milieu. Also, in order to render the English document more succinct and practical some of the examples and tables used in the original documents have been changed, removed or presented in the annex of each document.

Manual One - Basic Concepts in Educational Evaluation

This manual presents the elementary concepts that an educator should know and understand in order to undertake evaluation in schools. The three major stages in the evaluation process are described in detail with specific illustrations to aid teachers understand the importance of each stage.

The two chief evaluation approaches, formative and summative evaluation are briefly presented with practical examples of the salient elements of each approach. This manual is an essential document for an educator wishing to undertake student evaluation.

Manual Two - Glossary

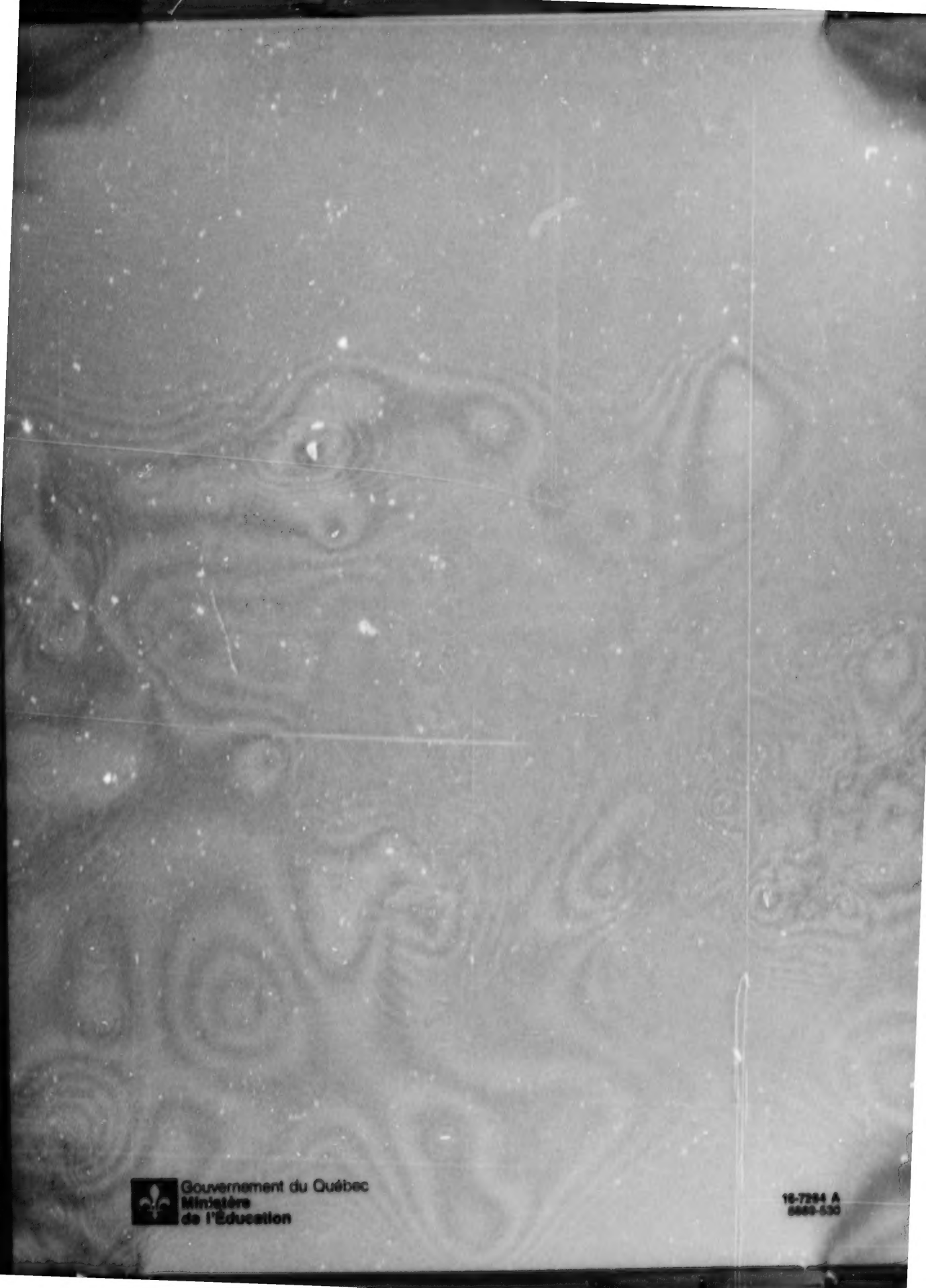
This manual presents the key terms and concepts that an educator should know and understand in order to undertake educational evaluation. The Glossary compiles in alphabetical order, with cross-references, most of the current terms in evaluation and statistics. This manual is an easy to use document which will prove to be handy in the classroom, teachers' lounge and in the school board offices.

Manual Three - Formative Evaluation

This manual will be of particular interest to teachers since the authors have taken great care to present all the relevant information on formative evaluation. Teachers will find numerous practical examples of recommended formative evaluation techniques which can be used in a variety of classroom situations. This manual was expressly written with the teacher's needs in mind.

Manual Four - Summative Evaluation

The fourth manual in this series focuses on "end-of-year" evaluation. Summative and formative evaluation concepts, techniques and instruments are presented and compared. There are many useful examples of various techniques used in summative evaluation which will help school administrations plan their evaluation program. Although this manual deals with the "administrative" aspects of evaluation, teachers are urged to consult this manual in order to understand the differences and similarities between these two important educational evaluation approaches.



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